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THE EFFECT OF PARTICIPATION IN A VOCATIONAL CLUSTER ON VOCATIONAL MATURITY

by

WAYNE DAVID THOMPSON

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled, "The Effect of Participation in a Vocational Cluster on Vocational Maturity," submitted by Wayne David Thompson in partial fulfillment of the requirements for the degree of Master of Education.

DEDICATED

TO

MY

WIFE

JOYCE

ABSTRACT

The purpose of this study was to measure the effect of a vocational cluster on the development of a student's vocational maturity. Additionally, the researcher investigated the possible relationship of Career Maturity Inventory scores to either or both of the Verbal Reasoning plus Numerical Ability scores of the Differential Aptitude Tests (DAT VR + NA) and grade-point averages (GPA's).

The research was experimental in design using a treatment and a control group with a statistical control on suspected potentially contaminating variables, namely: (1) raw intelligence scores and (2) grade-point averages for grade ten.

The sample for the treatment group and the control group was taken from the total number of grade ten students who had registered for the vocational cluster during the 1973-74 school year at Melville Comprehensive School. The treatment group included all students enrolled in a vocational cluster for the first semester while the control group consisted of all the vocation cluster students enrolled in the second semester of that school year.

The instrument selected for this study was the Attitude Scale of the Career Maturity Inventory.

The CMI scores for the treatment and control groups were compared using Analysis of Variance. Pearson product-moment correlations were calculated to determine the correlation of CMI scores with each of DAT (VR + NA) scores and GPA's. Cumulative percentage ogives of total CMI scores were constructed to compare each of the treatment group and control group to the standardization sample.

The Results of the Study revealed:

(1) That there were no significant differences between the CMI scores for the treatment group and those for the control group.

(2) That CMI scores did not correlate with either of DAT (VR + NA) or grade ten GPA's.

(3) That both the treatment and the control group scored much lower on the CMI than did tenth grade students in the standardization sample.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

One of the broad aims of vocational education is to prepare individuals to enter the world of work with an occupational level of skill. That task is the responsibility of the vocational education teacher in the secondary schools of the nation and has been since the enactment of the Technical Education Act of 1919.

The appropriateness of traditional vocational educational programs of studies, which require commitment to specificity at the secondary school level, has been challenged by evidence that youth at that age are not ready to make firm career choices (Ginzberg and others, 1951: Super, 1967).

Maley (1969), along with other vocational educators, has proposed a "Cluster Concept" of vocational education as a viable alternative to contemorary vocational education programs. An examination of Havighurst's (1964) "stages of vocational development," and O'Hara's (1968) "stages of vocational learning," lends support for the appropriateness of clustering vocational educational courses rather than teaching specific vocational educational courses.

There are a number of departments of education in North America which are currently advocating that vocational education courses be clustered for families of occupations rather than for isolated occupations. In the Province of Alberta these clusters are referred to as Career Fields which include: Visual Communications, Mechanics, Construction and Fabrication, Electricity-Electronics,

Personal Services, Performing Arts and Horticulture.

In Saskatchewan a type of vocational cluster has been introduced at Melville Comprehensive School at the grade ten level. The effectiveness of that program on the vocational maturity of the student has never been subjected to a formalized research investigation.

Purpose of the Study

The purpose of this study was to attempt to measure the effect of participation in a vocational cluster on the development of a student's vocational maturity. Super (1955) defined vocational maturity as: " . . . the degree of development, the place reached on the continuum of vocational development from exploration to decline. . . . vocational maturity is conceptually similar to mental age in early adolescence . . . (p. 153)."

The following supportive objectives were investigated:

(1) To determine if there was a significant difference in levels of vocational maturity between the group of grade ten students who participated in a vocational cluster and the control group who did not participate in a vocational cluster.

(2) To determine if vocational maturity scores for participants of the experimental group varied with their raw intelligence scores.

(3) To determine if vocational maturity scores for participants of the experimental group varied with their grade ten grade-point averages.

Hypothesis

The following hypothesis was tested in this study:

> The treatment group, composed of grade ten students who took a vocational cluster for one semester, will have a higher career maturity mean score than the control group, composed of grade ten students who plan to enroll in a vocational cluster during the second semester of the same year.

Definitions Of Terms

The following operational definitions apply to this study and will be used throughout.

Vocational Cluster

Although this term has had varying interpretations in the literature, the definition given by Maley (1967) was found to be acceptable for this study. In defining the term "Vocational Cluster", Maley wrote:

> . . . [it is] a form of vocational education directed toward the preparation of individuals for entrance into a spectrum of occupations. The occupations selected for a "spectrum" or "cluster" are those found to require the same proficiencies in a number of areas, namely, measurement, communications, mathematics, science, skill, and general information (p. 22).

The vocational cluster involved in the research was a mechanics cluster. The term "vocational cluster" and "mechanics cluster" are used interchangeably throughout this study.

Vocational Maturity

Drawing on the works of Ginzberg (1951), Super (1955), and his own very extensive research, Crites (1965) gave the following definition for vocational maturity:

> The concept of vocational maturity is more comprehensive than vocational choice, including not only the selection of an occupation but also attitudes toward decision making, comprehending and

> understanding of job requirements, planning activity and ability, and development of vocational capabilities (p. 4).

Vocational Maturity Score

The Vocational Maturity Score is the total score that a student achieves on the 50 item Attitude Scale of the Career Maturity Inventory designed and standardized by Crites (1973).

Instrumentation

The instrument selected for this study was Form A-1, Attitude Scale of the Career Maturity Inventory developed by Crites at the University of Iowa (a copy of this instrument can be found in Appendix A). This scale is made up of 50 statements about occupational choice and work. Students respond to each statement by indicating "True" if they "agree or mostly agree" with the statement. If they "disagree or mostly disagree" with the statement they respond by indicating "False". Statements are included in the scale which are relative to each of the following dimensions of vocational choice attitudes (Crites: 1965).

(1) Involvement in the choice process.
(2) Orientation toward work.
(3) Independence in decision-making.
(4) Preference for vocational choice factors.
(5) Conceptions of the choice process.

This instrument was selected for the following reasons: (1) it measures aspects of vocational maturity which have relevance to this study, (2) it has acceptable levels of reliability and validity, and (3) it was standardized with a population which was not judged to be systematically different from the population of this study. The instrument is fully discussed in Chapter III.

Population and Sample

The population for this study included all the students in Grade ten enrolled at Melville Comprehensive School during the 1973-74 school year.

The sample for the treatment group and the control group were taken from the total number of grade ten students who had registered for the vocational cluster during the 1973-74 school year at Melville Comprehensive School. The treatment group included all students who were timetabled for a vocational cluster for the first semester. The control group consisted of all the remaining vocational cluster students who were enrolled in the cluster program during the second semester of that school year. All students registered in the cluster program were taking the course as an elective with their timetables prepared by the guidance department. There appeared to be no reason to suspect any systematic differences between the two groups. Although these samples were not randomly assigned to each group, the lack of selective bias seemed to assure an approximation of randomness.

Statement of Limitations

The research had the following limitations:

1. It was limited to grade ten students at Melville Comprehensive School.
2. It was limited to a population which was mostly male students since few female students elected this course.
3. It was limited to students enrolled in a vocational cluster course.

4. It was limited to responses made by participants to the Career Maturity Inventory.

Overview of Methodology

The methodology is outlined briefly in this section but is dealt with in greater detail in Chapter III.

This study was experimental in design, using a treatment and a control group with a statistical control on suspected potentially contaminating variables, namely: (1) raw intelligence scores and (2) grade-point averages for grade ten.

A pretest was not used for two reasons: (1) there was no apparent reason to suspect the presence of systematic differences between these two groups and (2) there was at least a small risk of sensitizing the students to the problem under investigation if a pretest was used.

The research design may be diagramed as follows:

$R_1 \quad X \quad O_1$

$R_2 \qquad O_2$

R_1 denotes the sample selected for the treatment group.

X represents exposure to a vocational cluster.

O_1 represents the vocational maturity scores of the treatment group at the end of the first semester.

R_2 denotes the sample selected for the control group.

O_2 represents the vocational maturity scores of the control group at the beginning of the second semester.

Permission was obtained from the principal of the school to involve the grade ten students in this study. The principal also was

very helpful in providing school time and space for the administration of the instrument. The school administration also placed the school records at the disposal of the reacher so that data could be collected on raw intelligence scores and grade-point averages, from these records.

The Attitude Scale of the Career Maturity Inventory was administered and scored by the researcher with the help and cooperation of the school guidance counsellor. This scale was administered to the treatment group at the end of the first semester, which was in the last week of the month of January, 1974, and to the control group at the beginning of the second semester of the school year which was during the first week of February, 1974.

The data were analyzed statistically to determine if a significant correlation existed between vocational maturity scores and either or both of: intelligence raw scores and grade ten grade-point averages. If either had been found to correlate significantly with vocational maturity scores the data would have been analyzed using Analysis of Covariance. The covariates being one or both of intelligence raw scores and/or grade ten grade-point averages. Since no significant correlations were found, the data were analyzed statistically using Analysis of Variance. The University of Alberta computer facilities were used in conjunction with appropriate programs from the Division of Educational Research Services of the Faculty of Education.

The analysis was designed to determine if significant differences in vocational maturity occured due to treatment. The level of significance was set <u>a priori</u> at .10. This part of the research is fully discussed in Chapter IV.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter is presented in three sections. The first section contains a review of relevant literature on Career Development Theory. The second section presents a review of the literature concerning Vocational Clusters. The last section of this chapter summarizes the review of the literature related to the study.

Career Development Theory

During the first three to four decades of this century, authorities writing in vocational guidance literature of North America (Parsons, 1909: Paterson and Darley, 1936: Williamson, 1939), generally described vocational choice as a point in time event which was more or less an isolated experience usually occuring upon leaving high school. This ahistorical concept of vocational choice, according to Crites (1973), was "institutionalized and perpetuated by the host of trait-and-factor measures designed to faciliate the process of 'matching men with jobs' (p. 5)."

In an attempt to find models of vocational behavior which would be conceptually more fertile, vocational psychologists began to examine vocational choice in the context of a developmental process instead of as a time event. Buhler (1933), a German psychologist who conducted studies of life stages of people, pointed out that adolescents and adults face a succession of emerging problems as they go through life.

Some of these problems were peculiar to particular stages of development of the individual. This developmental concept was further supported by the works of Davidson and Anderson (1937), Carter (1940), Super (1942), Strong (1943), and Miller and Form (1951).

In the early 1950's, Ginzberg and others (1951) strongly criticized the existing research, in vocational development, for its lack of a theoretical base. As a result of their research on vocational choice, Ginzberg and others (1951), formulated a theory of vocational choice which had four major postulates which were summarized by Super (1953) as follows:

> (1) Occupational choice is a developmental process which typically takes place over a period of some ten years (Ginzberg (1972) later revised this element of the theory, describing occupational choice as a lifelong process of decision making).
>
> (2) The process is largely irreversible (Ginzberg (1972) also modified this element of the original theory. The revised theory refers to the cumulative effect of occupational decisions made between childhood and the 25th year of an individual's life span but rejects the idea of an irreversible impact on the individual's career).
>
> (3) The process of occupational choice ends in a compromise between interests, capacities, values and opportunities.
>
> (4) There are three periods of occupational choice: the period of fantasy choice, governed largely by the wish to be an adult; the period of tentative choices beginning at about age 11 and determined largely by interests, then by capacities, and then by values; and the period of realistic choices beginning at about age 17, in which exploratory, crystallization, and specification phases succeed each other (pp. 185-186).

Ginzberg's theory and his pointed criticism of existing research led Super (1953) to outline his developmental theory more clearly. Drawing on previous research which he had done in 1942 and the 20 year

longitudinal study (The Career Pattern Study) launched in 1951 and the research of others (Buhler, 1933; Carter, 1940; Davidson and Anderson, 1937; Strong, 1943; Ginzberg and others, 1951; and Miller and Form, 1951), Super (1953) formulated ten propositions which should underlie a theory of vocational development. The ten propositions are as follows:

(1) People differ in their abilities, interests and personalities.

(2) They are qualified, by virtue of these characteristics, each for a number of occupations.

(3) Each of these occupations require a characteristic pattern of abilities, interests and personality traits, with tolerances wide enough, however, to allow both some variety of occupations for each individual and some variety of individuals in each occupations.

(4) Vocational preferences and competencies, the situations in which people live and work, and hence their self concepts, change with time and experience (although self concepts are generally fairly stable from late adolescence until late maturity), making choice and adjustment a continuous process.

(5) This process may be summed up in a series of life stages characterized as those of growth, exploration, establishment, maintenance, and decline, and these stages may in turn be subdivded into (a) the fantasy, tentative, and realistic phases of the exploratory stage, and (b) the trial and stable phases of the establishment stage.

(6) The nature of the career pattern (that is, the occupational level attained and the sequence, frequency, and duration of trial and stable jobs) is determined by the individual's parental socioeconomic level, mental ability, and personality characteristics, and by opportunities to which he is exposed.

(7) Development through the life stages can be guided, partly by faciliating the process of maturation of abilities and interests and partly by aiding in reality testing and in the development of the self concept.

(8) The process of vocational development is essentially that of developing and implementing a self concept, it is a compromise process in which the self concept is a product of the interaction of inherited aptitudes, neural and endocrine make-up, opportunity to play various

roles, and evaluations of the extent to which the results of role playing meet with the approval of superiors and fellows.

(9) The process of compromise between individual and social factors, between self concept and reality, is one of role playing, whether the role is played in fantasy, in the counseling interview, or in real life activities such as school classes, clubs, part-time work, and entry jobs.

(10) Work satisfactions and life satisfactions depend upon the extent to which the individual finds adequate outlets for his abilities, interests, personality traits, and values; they depend upon his establishment in a type of work, a work situation, and a way of life in which he can play the kind of role which his growth and exploratory experiences had led him to consider congenial and appropriate (p. 189).

The basic elements of this theory are evident in later works of Super (1957, 1960, 1963a, 1963b, 1963c, 1972). These elements are also found in the writings of Crites (1961, 1965, 1969, 1973) and Gribbons and Lohmes (1968).

While Ginzberg and others (1951) presented a theory of vocational choice which applied to a period of some ten years in the life span of an individual, Super's Theory spans a major part of an individual's lifetime. Ginzberg's (1972) revised theory supported Super's position. The revised theory stated that ". . . the choice process is open ended, that it can coexist with the individual's working life (p. 169)." Super also noted that the concept of vocational development leads logically to a concept of vocational maturity. This concept of vocational maturity was first defined by Super (1955) as:

> Vocational maturity is used to denote the degree of development, the place reached on the continuum of vocational development from exploration to decline. Vocational maturity may be thought of as vocational age, conceptually similar to mental age in early adolescence (p. 153).

Elaborating on the concept of vocational maturity, Super (1963c) outlined how this concept allows the observer to determine the rate and degree of maturation relating to career matters. Super underlined the importance of understanding vocational maturity in terms of the congruence between an individual's vocational behavior and the expected vocational behavior at that age. Osipow (1968) explained Super's normative concept by using the following illustration:

> The vocationally mature 14-year-old will be concerned with assessing his interests and abilities to reach the goal of deciding on an educational plan, while the vocationally mature 45-year-old man will be concerned with ways he can maintain his career status in the face of competition from younger men (p. 123).

According to Super (1963c), the maturation process occurs by means of five activities which he calls vocational developmental tasks, which are; (1) Crystallization (14-18 years of age), (2) Specification (18-21 years of age), (3) Implementation (21-24 years of age), (4) Stabilization (25-35 years of age) and (5) Consolidation (35 years plus).

Although the task of crystallization can occur at nearly any age it tends to occur, as noted above, during the 14-18-year age span which has implications for high school educators. Attitudes and behaviors relevant to the development task of crystallization listed by Super (1963c) are:

a. awareness of the need to crystallize
b. use of resources
c. awareness of factors to consider
d. awareness of contingencies which may affect goals
e. differentiation of interests and values
f. formulation of a generalized preference
g. awareness of present-future relationships
h. consistency of preference
i. possession of information concerning the preferred occupation
j. planning for the preferred occupation

k. wisdom of the vocational preference (p. 138)

The dynamics of this developmental process have been explained in terms of the implementation of a self-concept through vocational activities. Many educational psychologists believe that this is the most vital part of Super's theory of vocational development (Osipow, 1968). As a consequence, many research studies conducted by educational psychologists, have investigated the relationship between self-concept and career choice (Osipow, 1968).

Research by Norrell and Grater (1960), and later replicated by Brown and Pool (1966), found that individuals who can accurately predict their interests, are more aware of themselves. Accuracy of prediction was measured by Strong's Vocational Interest Blank and self-awareness was defined in terms of Edward's Personal Preference Schedule.

Englander (1960) studied the relationship between self-perception and an individual's perception of persons in one's chosen occupation. This researcher found that prospective elementary teachers viewed the personal characteristics of elementary teachers in a fashion which was more congruent with their own personal characteristics than did respondents who had chosen occupations other than elementary teaching.

Kibrick's and Tiedeman's study, conducted in 1961, investigated the role of the nurse's self-concept in the selection of nursing as a career. These researchers hypothesized that persistence in nurse's training was a function of the congruence between the student's image of nursing and the image of nursing held by the supervisor. The results of the study supported this hypothesis.

Blocher and Schutz (1961) investigated the relationships between vocational preferences, occupational stereotypes, and self-descriptions

of twelfth grade boys. The results indicated a similarity between self-, ideal self-, and vocational self-concepts. Oppenheimer (1966) also found the occupational preferences expressed by liberal arts college students were consistent with their self-concepts.

Although most of the research findings, cited previously, lend support to Super's theory of vocational development as an implementation of the self-concept, many of these studies were based on samples drawn from particular groups of individuals such as nurses, teachers or college students.

Criticisms of Current Vocational Development Theory

Osipow (1968) noted that most current theories fail to account for the role of aptitudes in career behavior and emphasize the nonability aspects of human behavior that relate to vocational preference, selection, attainment and satisfaction (p. 227). This authority also observed that many theorists, including Ginzberg, Roe and Super, have not been explicit about the cause of abnormal career development. LoCascio gave support to Osipow's concern for the imperfections of the theories of Ginzberg, Roe and Super, when in 1964 he discussed impaired vocational development. These concerns are further emphasized by Lyon (1965), who is also supportive of Osipow's position, and makes the suggestion that there is a need for planning serical careers particularly where strong divergent talents are obvious.

Zytowski (1965) has also noted that many of the theorists have a tendency to base their theory on positive motives only and that they neglect to give attention to the role of avoidance behavior in the developmental process.

Tyler (1967) indicated another weakness which becomes obvious when the samples used by the researchers in their investigations are brought under close scrutiny. Many of the participants who were involved in these studies were males from middle class backgrounds. Tyler believes that because of these sampling procedures most of the conclusions about the progression through maturation stages cannot be generalized beyond middle-class males.

Facilitation of Career Development

There is some evidence to indicate that the vocational development process is becoming more complex as society increases in its complexity. Drucker (1969) noted that the level of opportunity available in our society has created an unprecedented level of personal responsibility for what one is and what one becomes. Toffler (1970) speculated on the increasing possibility of this problem when he wrote:

> Ironically, the people of the future may suffer not from an absence of choice but from a paralyzing surfeit of it. They may turn out to be victims of that peculiarly super-industrial dilemma: over choice (p. 26).

Society's increasing complexity and the difficulties encountered by young people today in making vocational decisions suggests the need of research to establish techniques for facilitating vocational development. Limited research has shown that various educational experiences can modify vocational maturity. Experimental research investigations conducted by Krumboltz and Thoresen (1964) indicated that reinforcement counselling procedures affected vocational behavior. Two types of reinforcement counselling were found to result in greater exploration of relevant occupational and education information outside of the

counselling situation. One of these techniques was a counselling interview in which the counsellor attempted to reinforce each information-seeking response in the subsequent interview one week later. The other technique was a counselling interview which began with a tape recording of a previous interview with a male student who had been concerned about his future career but had since reached a decision with which he was pleased. Following the playing of the tape, the counsellor attempted to reinforce information-seeking responses and again during a second interview one week later. The findings in this study were supported by research by Krumboltz and Schroeder (1965) and by Thoresen and Krumboltz (1967).

Pucel and others (1972) found that post-high school vocational training affected vocational maturity as measured by the Attitude Scale of Crites's (1965) Vocational Development Inventory. Students enrolled in post-high school technical courses (computer programming, electronics, data processing, and offset printing); and in psychomotor skill development courses (carpentry, diesel mechanics, farm equipment mechanics, automotives, and machine shop); and sales clerical courses (accounting, fashion merchandising, sales and marketing, and sales management) were measured by the above mentioned Attitude Scale and compared with control groups. The results indicated that students enrolled in the technical programs increased in vocational maturity while students enrolled in skilled and sales clerical programs did not.

Vocational Clusters

One of the broad aims of vocational education, as has already been pointed out in Chapter I, is to prepare individuals to enter the

world of work with an occupational level of skill. However, the traditional approach to secondary vocational education has been criticized during the last decade. Maley (1967, 1969) and Bushnell (1969) have criticized two aspects of traditional vocational education in the United States. The criticisms of these two noted vocational educators were the narrow focus of vocational education on specific job skills and the tendancy of vocational educators to force these students to make specific career choices before they are vocationally mature. The authoritative literature on vocational development theory, previously cited, lends strong support to the latter criticism. Wiles (1963) noted that the specialized approach has tended to prepare individuals for employment within the community while there is evidence that half of the average school's graduates will migrate to another community (p. 126).

According to Maley (1969), clustering has been considered as an alternative to the traditional approach because of four main issues: (1) the increasing mobility of people on a geographical base, (2) the need for individual mobility within an industry, (3) the need for skills of adaption to technological changes, and (4) the problem of career choice (p. 3).

Rumpf (1964) also noted the problem of worker mobility when he observed that: "Industry needs workers who are flexible, workers who have a field of skills and basic education that will enable them to adapt rapidly to occupational changes (p. 10)."

Many different techniques have been utilized in generating cluster curriculums. Bottenberg and Christal (1961), Ward (1961) and Christal (Undated) have described a method for clustering technical curriculums for the United States Air Force. The method they described is called the "MAXOF Clustering Model which takes its name from the

concept of MAXimizing an Objective Function (Christal, Undated, p. 1)" This model is a highly flexible technique for computer clustering people or things into categories according to selected parameters. Christal suggested that this model could be utilized by civilian curriculum planners.

Rahmlow (1967), Maley (1969) and Sjorgren (1969) have used different approaches to vocational curriculum clustering at the secondary school level, however Morrison (1969) has noted that, "the general strategy is the same: to define core curriculum based on common requirements of job clusters (p. 79)." The commonalities upon which Maley (1969) based his clusters were: (1) communications, (2) measurement, (3) skills, (4) mathematics and science, and (5) information.

Maley's (1969) four year study on vocational clusters had three phases: (1) Examination of related research and conducting acceptability and feasibility studies, (2) Teacher education and preparation of curriculum materials, and (3) Implementation of experimental clusters and field evaluation. Results of the feasibility and acceptability studies were positive. The field evaluation was conducted in ten schools and involved eleven teachers and eleven separate cluster programs. These programs consisted of the following clusters: construction, electro-mechanical, air-conditioning and refrigeration, metal forming and fabrication, and assembler. Each experimental program was compared with a corresponding control group. However, the experimental procedures had too many limitations to render conclusive evidence concerning the effectiveness of this program. Maley (1969) acknowledged these limitations of his research when he wrote:

> The uncontrolled variables of teacher performance, physical facilities, administrative support, pupil placement in the program, etc., made it impossible to attribute success or failure to the "program" as was developed for each of the clusters (p. 29).

However, Mietus (1969) contended that Maley's study permitted the following conclusions to be drawn:

> The action research conducted provided data which made it evident that the cluster concept programs have the potential of becoming vigorous, alternate forms of vocational education. The programs changed student behavior in the direction of the established objectives . . . broadened interests, flexibility of occupational choices within a cluster, and growth in performance tasks (p. 69).

Although little experimental research has been conducted on a clustered vocational education course, there is field evidence of the success of various forms of cluster programs. Geissenhainer (1967) reported empirical evidence of the success of a cluster program in Maryland which has been in operation since 1949. Geissenhainer noted that career choices made by students in the program during their senior high school year were valid. However, no supportive documentation was given.

Wolansky (1970), in an article on the cluster programs begun in Oregon, stated that these programs had an "impression" of success. However, most of the programs were new and the evaluation had been of a very general nature (p. 54). There appears to be growing support for clusters in Oregon. Hickman (1971) reported that "Oregon . . . expects about half of all high school students in the state to be in cluster programs by 1975." The Oregon State Department of Education has recommended 12 clusters to include: industrial mechanics; general clerical; marketing; agriculture; service wood products; secretarial; metal working; bookkeeping and accounting; health; and electricity-electronics.

The United States Office of Education (1971) has recommended clustering for career education. The Office's Bureau of Adult, Vocational, and Technical Education has identified 15 occupational clusters which include: transportation; health; agri-business and natural resourses; business and office; communications and media; consumer and homemaking education; construction; environment; fine arts and humanities; hospitality and recreation; manufacturing; marine science; marketing and distribution; personal services; and public service (p. 9).

Kratochvil and Thompson (1972) have noted that the current trend toward career education has given new impetus to clustering. Phelps (1973) also supported this view when he wrote:

> The ultimate purpose of career education . . . appears to be the preparation of people of all ages, and all levels of educational attainment, for successful careers in the world of work . . . this basic definition will . . . include career awareness, career exploration, career development . . . The emerging vehicle for coordinating these components in an instructional program appears to be the industry/occupational cluster.

Harder (1974) has indicated that the Department of Education in the Province of Alberta has become concerned with career development through industrial education. Because of that concern the industrial education curriculum has been clustered. The clusters in Alberta are referred to as Career Fields and include: visual communications; mechanics; construction and fabrication; electricity-electronics; personal services; performing arts; and horticulture.

Summary

The review of the literature indicates that many research

investigations have been conducted to describe and assess vocational development while few experimental research investigations have been conducted to evaluate vocational education at the secondary level.

The vast amount of work by theorists and researchers has contributed much to an understanding of the elaborate socialization process required to transform the child into the working adult. An understanding of this process is of importance to all since it encompasses so much of 1 fe: firstly as participants immediately involved in the maturation process, and secondly as counsellor to children in the immediate family and in the school milieu.

While current theories of vocational development do fall short in some important respects, as previously discussed, a strong beginning has been made to establish the fundamental assumptions on which these theories are built. As Tennyson (1968) pointed out, "an impressive body of knowledge about vocational development and behavior has accumulated (p. 361)."

A number of studies (Krumboltz and Thoresen (1964), Krumboltz and Schroeder (1965) and Thoresen and Krumboltz (1967) have shown that some educational experiences facilitate vocational development.

The literature revealed that clustered vocational education courses are a viable alternative to the traditional method of offering vocational education courses in specific areas. A wide spread interest in career education has given rise to increased clustering of vocational education courses.

In the following chapter the methodology for the study is presented.

CHAPTER III

METHODOLOGY

Information about the locale and time of this research is included in this chapter. The method used to determine the population and to select the sample are described in detail. The instrument is also described with information presented concerning its development, reliability and validity. The manner in which the research instrument was used to collect data is also presented in this chapter.

Description of Program

Melville Comprehensive School opened in the fall of 1971 and the grade ten mechanics cluster program of study was developed at that time. Minor modifications to the program of study have been made since then (Appendix C, page 74, contains a list of the objectives and the course outline for this program of study).

The program of study for the mechanics cluster was developed by the Industrial Education staff at Melville Comprehensive School in consultation with the principal of the school. In developing this program, the staff drew on the work of Maley (1967), Wolansky (1970) and the Board of Education, Salem, Oregon. After the program of study was acceptable to the staff and administration, it was submitted to the Department of Education at Regina, Saskatchewan, where it subsequently received approval.

Among other objectives, this program was designed to make

students aware of career opportunities in general, but particularly in industrial and related fields. It also sought to simulate real life situations to help students develop an awareness and understanding of life in various fields of the industrial world.

The method of presentation of instructional content for this program was a team-teaching-mini-course approach. To date the program has only been offered at the grade ten level as a one credit elective. Grade eleven and grade twelve students may elect one or more one-credit vocational education courses. These courses include automotive, drafting, electronics, machining and welding.

The Sample

Grade ten students at Melville Comprehensive School were chosen as the population for this study because of the researcher's personal interest in this school and the cluster program offered at the grade ten level. This school has an enrollment of approximately 600 students from the City of Melville and the surrounding area. Because of this semi-rural setting, students enrolled at this school come from families that have a wide variety of occupational backgrounds.

During the 1973-74 school year there were approximately 200 students enrolled in grade ten, of these, approximately 100 were male and 100 were female. Ninety of the male students elected to enroll in a vocational cluster program while only eight of the female students elected to participate in the program.

Timetables for these students were prepared by the guidance department from the pre-registration forms that the students completed.

Fifty-two of these students (49 males and 3 females) were assigned to the mechanics cluster for the first semester. Forty-six students (41 males and 5 females) were assigned to the mechanics cluster for the second semester of the 1973-74 school year.

All students registered in the cluster for the first semester were chosen for the treatment group and all students registered for the second semester were chosen as the control group. The final total for the treatment group was 51 because one girl dropped out of school during the second semester making it impossible to calculate a grade-point average for this student who was therefore eliminated from the study. The control group's final total was 44 students because intelligence scores were not available for two males, consequently these two students were not included in the research.

The decision to use the first semester group as the treatment group and the second semester group as the control group was made basically so that the treatment and control groups could be measured on the Career Maturity Inventory at approximately the same point in time and in this way minimize potentially contaminating factors. Although students were not randomly assigned to treatment and control groups, the lack of selective bias seemed to indicate that there was no reason to believe that systematic differences existed between these two groups.

Measuring Vocational Maturity

As a result of the increased interest in the theory of vocational development of secondary school students, instruments are being designed that will measure the various aspects of vocational maturity. However,

because of the problems involved in developing an instrument to provide an objective measure of vocational maturity, to date only a few of these instruments have been designed (Westbrook and Mastic, 1973). One such instrument is Crites's (1973) Career Maturity Inventory (CMI).

The development of this instrument began in 1961 as a result of Crites's desire to conduct research on Super's (1957) theory of vocational development.

> To cast Super's dimensions of vocational maturity into a conceptual framework which has heuristic value for measurement and theory as well as subsumptive utility for comprehending research findings, Crites (1965, in press) has proposed the model shown in Figure 1. . . . . the lowest level includes the operationally defined variables of interest; the intermediate level represents group factors constituted from the interrelationships among the variables; and the highest level is defined by the common variance among the group factors (Crites, 1973, p. 6).

In developing the VDI, Crites (1965) reasoned that a device purporting to measure a developmental variable must yield scores which are a monotonic function of age. The test construction methodology was a combination of that used in the "Stanford-Binet" and the "Wechsler Adult Intelligence Scale."

> From the age-scale this model incorporates a scoring key derived from item responses which differentiate between older and younger age groups within a given vocational life stage. . . . . from the point-scale the proposed model follows the practice of constructing norms for each age level rather than using quotients based upon age ratios. In other words, an individual's peer group, not his age, is the reference point for evaluating his career maturity (Crites, 1961, p. 258).

The CMI was developed in two parts, the Attitude Scale and the Competence Test. To date, most research on the CMI has been concerned with the Attitude Scale and it is the Attitude Scale which has been

selected as the research instrument for this research.

Subject matter for a universe of item content for this scale was drawn from attitudinal statements on vocational choice that were made by clients in vocational counseling situations over a period of five years. These verbalizations were then edited to make them as realistic as possible, yet consistent with the theoretical definitions of the variables in the model of vocational maturity (Figure 1). In choosing items for an initial pool of 100 items, an attempt was made to include items which would define each of the attitude clusters listed in Table 1 (Crites, 1973, p. 12). The initial 100 item Attitude Scale was administered during the 1961-1962 school term to 2,822 students in grades five through twelve of the Cedar Rapids, Iowa, school system. This community of approximately 92,000 persons (1960 census) had a diversified economy and was thought to have a representative social structure (Crites 1973). Five schools were sampled from the twenty-five in the system. Item means for both the 5-point and the True-False versions of the scale were compared across the age and grade groupings using analysis of variance and t-tests. Crites (1971) explained how 50 items were selected from the initial 100 items when he wrote:

> If an item related monotonically, i.e., its means either increased or decreased with no statistically significant reversals to these indices of time [age/grade] , it was provisionally accepted for the scale, the plan being to further evaluate the items against the same criterion when longitudinal data were available from yearly follow-up testings (p. 11).

The results of the standardization were reported by Crites (1973).

> (1) Of the initial pool of 100 items which were tried out, 50 were monotonically related to grade. This variable was found to yield greater differentiation than age and was consequently chosen as the index of time in all

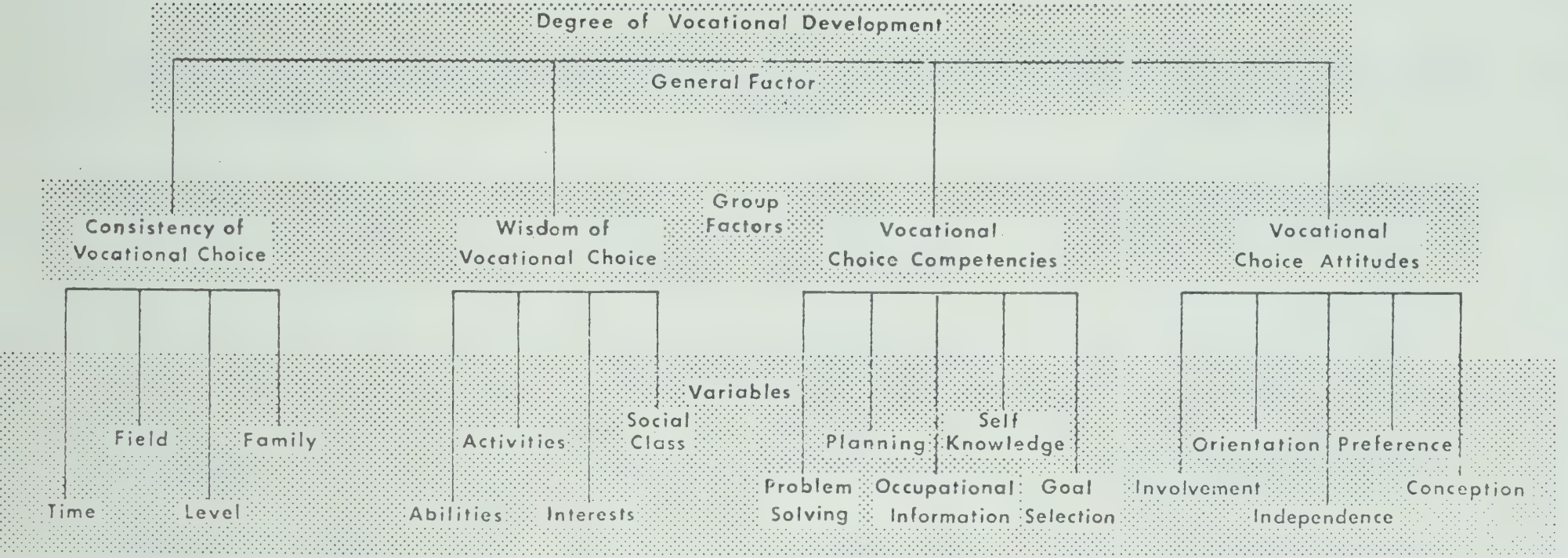

FIGURE I

THE CONSTRUCT OF VOCATIONAL MATURITY

Crites (1965, p. 5)

TABLE 1

VARIABLES IN THE ATTITUDE SCALE OF THE CMI

DIMENSION	DEFINITION	SAMPLE ITEM
Involvement in the choice process	Extent to which individual is actively participating in the process of making a choice.	"I seldom think about the job I want to enter."
Orientation toward work	Extent to which individual is task or pleasure-oriented in his attitudes toward work and the values he places upon work.	"Work is dull and unpleasant." "Work is worthwhile mainly because it lets you buy the things you want."
Independence in decision making	Extent to which individual relies upon others in the choice of an occupation.	"I plan to follow the line of work my parents suggest."
Preference for career choice factors	Extent to which individual bases his choice upon a particular factor.	"Whether you are interested in a job is not as important as whether you can do the work."
Conceptions of the choice process	Extent to which individual has accurate or inaccurate conceptions about making a career choice	"A person can do any kind of work he wants as long as he tries hard."

subsequent analyses.

(2) There were no significant differences between items written in the first and third person; so both grammatical forms were retained.

(3) There were differences in differentiation between both age and grade groupings for the two types of item format, with the True-False option producing a greater number of significant differences than the five-point scale. Consequently, the True-False response format was adopted and has been used in administering the Attitude Scale since the standardization.

(4) Trends in item responses from the lower to the upper grades were predominantly from True to False, with stages for many of them corresponding to the transitional points in the school structure . . .

(5) Differences between the sexes and schools were negligible.

(6) Total CM score analyses indicated that there was a systematic increase in means across grades, with the possible exception of the eleventh grade, which was lower than the twelfth but equal to the tenth grade (pp. 13-14).

The outcome of the standardization was an Attitude Scale consisting of fifty monotonically grade-related items stated in both the first and third person using a True-False format.

Reliability

Crites (1973) discussed the reliability of the Attitude Scale and reported a correlation coefficient of .71 for 1648 subjects in grades 6 through 12 tested and retested over a one-year interval. Although this is not an indication of extremely high stability, Crites noted that an extremely high stability coefficient would not be consistent with the theoretical proposition that vocational behavior matures over time.

Item data from Grades 6 through 12 were analyzed and internal consistency estimates (Kuder-Richardson Formula 20) were calculated. The coefficients ranged from .65 to .84 with a mean of .74. These

coefficients are comparable to those of instruments similar to the Attitude Scale (Super and Crites, 1962).

Validity

Empirical and logical evidence has been indicative of content validity. Hall (1962) reported on a comparison between the empirical scoring key and one derived by a panel of expert judges (five male and five female counselling psychologists). The percentage of agreement was 74 percent. The logical evidence of validity is shown by the way items were selected. As outlined earlier, subject matter for the items was collected from attitudinal statements made by clients in a counselling situation. Statements were not included unless they were "consistent with the theoretical definitions of the variables in the model of career maturity (Crites, 1973, p. 8)."

Criterion-related validity, according to the American Psychological Association (1966), is "demonstrated by comparing the test scores with one or more external variables considered to provide a direct measure of the characteristic or behavior in question (p. 13)." A number of studies have compared the Attitude Scale to criterion variables. Careh (1965) investigated the relationship of decisiveness in career choice to the Attitude Scale with 346 male college students. He reported a biserial r of .25. Cooter (1966) compared scores for the CMI with scores for Gribbons and Lohnes' "Readiness for Vocational Planning." The correlation was .38 ($p < .01$). In a similar study, Bathory (1967) found an r of .39 ($p < .01$) when the Attitude Scale was correlated with Miller and Haller's (1964) "Occupational Aspiration Scale."

Crites (1971) reported that three studies which could be classified as applied research, where an independent variable had been

manipulated, produced positive findings. Asbury (1967) investigated the effects of counselling disadvantaged eighth graders from the Kentucky Appalachian region. When counselled and uncounselled samples (N=108) were compared, counselled students scored significantly ($p < .01$) higher on the Attitude Scale. Gilliland's (1966) study used treatment and control groups stratified by sex. The treatment consisted of 36 one-hour weekly group counselling sessions. The treatment group scored higher ($p < .01$) on the Attitude Scale than did the control group. No sex differences were found. The third research study, by Bovee (1967) produced findings similar to those of Asbury and Gilliland.

Data Collection

Three types of data were collected for each member of the treatment and control groups. This section describes how these data were obtained.

Cumulative record folders are maintained in the school office for each student. These folders contain a summary of the student's performance on a series of two or three intelligence tests administered over a period of several years. One of these measures of intelligence was a combination of Verbal Reasoning and Numerical Ability, Form L, of the Differential Aptitude Tests (DAT). These tests had been administered by the school guidance counsellor during the year prior to the data collection for this research. The DAT scores were chosen as a measure of intelligence for this research rather than the other intelligence test scores summarized in the cumulative records for three reasons: (1) it was the only intelligence test common to all of the grade ten

students and (2) it was the most recent intelligence test that had been administered to grade ten students and (3) it appeared to be an acceptable measure of intelligence. Bennett and others (1966) have summarized some evidence showing the relationship of the DAT scores to scores of other intelligence tests. Bennett and others (1966) noted that:

> . . . a review of the coefficients of correlation of DAT (Forms L and M) VR + NA with several well-known scholastic aptitude or intelligence tests reveals consistently high coefficients: only five of the 34 . . . are below .70 while 15 are larger than .80. Apparently the VR + NA score serves the same purposes for which general mental ability tests are used (p. 8-1).

Table 6, page 43, of chapter IV contains the DAT scores for the treatment group. The DAT scores for the control group are located in Table 7, page 45.

The Attitude Scale of the Career Maturity Inventory (CMI) was administered to the treatment group in January, 1974, during the last week of the first semester, after all areas of the mechanics cluster had been completed. All students who had participated in the program during the first semester were brought together in one large laboratory where the CMI was administered by the researcher with the help of the guidance counsellor. The CMI was administered in accordance with the instructions provided in the manual which accompanied the inventory. Due to the absence of one student when the CMI was administered to the group, the inventory was given to that student on a subsequent day by the researcher. All answer sheets were coded for future identification as treatment group data. These are summarized in Table 4, page 39, of Chapter IV.

On the first day of the second semester, in February, 1974, the CMI was administered to all members of the control group prior to exposure to the mechanics cluster, in the same manner it had been

administered to the treatment group. The administration and hand scoring of the answer sheets was conducted by the researcher with the help and cooperation of the school guidance counsellor. Table 5, page 41, of Chapter IV contains the CMI scores for the control group.

Grade ten grade-point averages (GPA) were derived by obtaining grades from the school records and calculating averages on the basis of four compulsory subjects, namely: literature, composition, social studies and science. In Saskatchewan there are five compulsory subjects at the grade ten level, the fifth one being mathematics. Since some students elected modern algebra, some geometry, and others general mathematics, it was decided that a meaningful grade-point average could not be calculated using all five of the compulsory subjects. The GPA for each research participant was calculated by the researcher with the aid of a desk calculator.

The next chapter of this report will describe in detail the data analysis phase of the study.

CHAPTER IV

DATA ANALYSIS

Introduction

Chapter III described in detail the methodology for this research, this chapter summarizes the statistical procedures that were used to test the experimental hypothesis and answer the supportive research objectives.

This research was conducted to investigate, specifically, the effect of a grade ten vocational cluster on the development of a student's vocational maturity. The researcher also wanted to determine if vocational maturity scores for participants of the experimental group varied with their raw intelligence scores and/or their grade-point averages.

Analysis

The data were analyzed statistically using an I. B. M. 360-67 computer at the University of Alberta, using programs from the Division of Educational Research Services Library, Faculty of Education. The data were first analyzed to test for significant correlations of CMI scores with either or both of DAT scores and grade-point averages using a computer program, DEST02, from the Division of Educational Research Services Library.

If significant correlations had been found with CMI scores and

either or both of DAT scores and grade-point averages, the data would have been analyzed using Analysis of Covariance to statistically control these two variables. However, since no significant correlations were found, these data were analyzed using a one-way Analysis of Variance computer program, ANOV 11, from the Division of Educational Research Services Library.

Pearson product-moment correlation calculations for comparisons between Career Maturity Inventory scores and each of raw intelligence scores and grade-point averages are presented in Table 2. T-values associated with R's and probabilities of T's are also given in this table. By comparing these probability values with the level of significance value of .10, decisions were made with respect to the significance of correlations between the CMI scores and each of DAT scores and GPA's.

CMI means for the treatment group and control group together with a grand (overall) mean are given in Table 3. By comparing the probability value of 0.664 to the level of significance value of .10, a decision was made concerning the hypothesis. The experimental hypothesis for this research stated that:

> The treatment group, composed of grade ten students who took a vocational cluster for one semester, will have a higher career maturity mean score than the control group, composed of grade ten students who plan to enroll in a vocational cluster during the second semester of the same year.

Since the probability of observing an F ratio of 0.19 was 0.664 (see Table 3) and since this probability was greater than the significance level which had been set a priori at .10, the hypothesis was rejected.

Career Maturity Inventory scores for the treatment group are presented in Table 4. Student number T42 received a score of 24, the

TABLE 2

CORRELATIONS FOR CMI, DAT AND GPA

	CMI	DAT	GPA
CMI	1.000000	0.149479	-0.092458
DAT	0.149479	1.000000	0.644056
GPA	-0.092458	0.644056	1.000000

T-VALUES ASSOCIATED WITH R's

	CMI	DAT	GPA
CMI	0.0	1.457905	-0.895472
DAT	1.457905	0.0	8.119245
GPA	-0.895472	8.119245	0.0

TABLE 2 (cont.)

PROBABILITIES OF T's

	CMI	DAT	GPA
CMI	0.0	0.148239	0.372850
DAT	0.148239	0.0	0.000001
GPA	0.372850	0.000001	0.0

lowest in this group. The highest score was 45 out of a possible 50, received by student number T9 with all other scores ranging between 24 and 45. The mean score, for the treatment group, was 34.078.

Data in Table 5 represents CMI scores for the control group. Student number C33 received a score of 26, the lowest in this group. The highest score was 45, received by student number C29. The mean score, for the control group, was 34.477.

Table 6 contains Differential Apptitude Test scores for the treatment group. These scores represent performance on the "Verbal Reasoning" (VR) and "Numerical Ability" (NA) tests of the DAT. These scores ranged from a low of 18 to a high of 68. The theoretical range of scores for this test is 0 to 90.

Differential Aptitude Test Scores (VR + NA) for the control group are given in Table 7. For this group the lowest DAT score was 18

TABLE 3

ANALYSIS OF VARIANCE FOR TREATMENT AND CONTROL GROUPS

MEANS FOR GROUPS

Treatment Group	34.078
Control Group	34.477
Grand Mean	34.263

Source	SS	MS	DF	F	P
Groups	0.37500000E + 01	0.37500000 + 01	1.	0.19	0.664
Error	0.18346875E + 04	0.19727814E + 02	93.		

TABLE 4

CMI SCORES FOR TREATMENT GROUP

STUDENT NUMBER	SCORE	SEX
T1	36	M
T2	35	M
T3	32	M
T4	35	M
T5	27	M
T6	26	M
T7	36	M
T8	26	M
T9	45	M
T10	35	M
T11	36	M
T12	31	M
T13	33	M
T14	37	M
T15	31	M
T16	36	M
T17	34	M
T18	32	M
T19	31	M
T20	34	M
T21	39	M
T22	41	M
T23	35	M
T24	39	M
T25	35	M
T26	30	M
T27	39	M
T28	38	M
T29	34	M
T30	36	M
T31	33	M
T32	31	M
T33	39	M
T34	30	M
T35	35	M
T36	32	M
T37	35	M
T38	34	M
T39	35	M
T40	27	M
T41	33	M
T42	24	M
T43	28	M

TABLE 4 (cont.)

CMI SCORES FOR TREATMENT GROUP

STUDENT NUMBER	SCORE	SEX
T44	41	M
T45	32	M
T46	30	M
T47	40	F
T48	32	F
T49	37	M
T50	42	M
T51	34	M

Range - 24 to 45

Mean - 34.078

and the highest score was 86 with all other scores ranging between these two.

Grade-point averages (GPA) for the treatment group are presented in Table 8. These GPA's range from a low of 43 to a high of 92, with a mean of 65.078

Table 9 contains GPA's for the control group. The range of GPA's was from 40 to 90, with a mean of 65.159.

The cumulative percentage ogives of total CMI scores for the treatment group, the control and the seventh and tenth grade levels of the standardization sample are presented in Figure 2. An examination of these ogives indicated that the ogives for the treatment group and the control group compared more closely with the ogives for the standardization sample at the seventh grade level than for any other grade

TABLE 5

CMI SCORES FOR CONTROL GROUP

STUDENT NUMBER	SCORE	SEX
C1	31	M
C2	28	M
C3	35	M
C4	31	M
C5	34	F
C6	36	M
C7	41	M
C8	38	M
C9	33	M
C10	33	M
C11	32	M
C12	35	M
C13	33	M
C14	39	M
C15	35	M
C16	33	M
C17	31	M
C18	39	M
C19	29	M
C20	28	M
C21	38	M
C22	32	M
C23	39	M
C24	36	M
C25	37	M
C26	36	M
C27	39	F
C28	32	M
C29	45	F
C30	30	M
C31	31	M
C32	37	M
C33	26	M
C34	37	M
C35	40	M
C36	41	M
C37	31	M
C38	32	M
C39	29	F
C40	39	M
C41	27	M
C42	28	M
C43	42	M

TABLE 5 (cont.)

CMI SCORES FOR CONTROL GROUP

STUDENT NUMBER	SCORE	SEX
C44	39	F

Range - 26 to 45

Mean - 34.477

level.

Chapter V will present a short summary of this research and offer some conclusions and observations. Recommendations for further research studies will also be given.

TABLE 6

DIFFERENTIAL APTITUDE TEST SCORES FOR TREATMENT GROUP

STUDENT NUMBER	SCORE (VR + NA)	SEX
T1	45	M
T2	65	M
T3	56	M
T4	65	M
T5	56	M
T6	53	M
T7	43	M
T8	34	M
T9	41	M
T10	49	M
T11	68	M
T12	44	M
T13	51	M
T14	18	M
T15	31	M
T16	29	M
T17	45	M
T18	57	M
T19	38	M
T20	63	M
T21	40	M
T22	59	M
T23	43	M
T24	39	M
T25	64	M
T26	40	M
T27	54	M
T28	35	M
T29	52	M
T30	27	M
T31	45	M
T32	55	M
T33	50	M
T34	62	M
T35	42	M
T36	52	M
T37	46	M
T38	51	M
T39	31	M
T40	36	M
T41	46	M
T42	22	M
T43	37	M

TABLE 6 (cont.)

DIFFERENTIAL APTITUDE TEST SCORES FOR TREATMENT GROUP

STUDENT NUMBER	SCORE (VR + NA)	SEX
T44	36	M
T45	39	M
T46	33	M
T47	47	F
T48	44	F
T49	45	M
T50	53	M
T51	38	M

Range - 18-68

TABLE 7

DIFFERENTIAL APTITUDE TEST SCORES FOR CONTROL GROUP

STUDENT NUMBER	SCORE (VR + NA)	SEX
C1	46	M
C2	53	M
C3	41	M
C4	32	M
C5	54	F
C6	30	M
C7	34	M
C8	31	M
C9	56	M
C10	56	M
C11	37	M
C12	44	M
C13	43	M
C14	57	M
C15	86	M
C16	55	M
C17	59	M
C18	40	M
C19	39	M
C20	57	M
C21	48	M
C22	18	M
C23	54	M
C24	49	M
C25	35	M
C26	56	M
C27	64	F
C28	46	M
C29	55	F
C30	25	M
C31	26	M
C32	32	M
C33	45	M
C34	45	M
C35	54	M
C36	55	M
C37	22	M
C38	39	M
C39	55	F
C40	36	M
C41	37	M
C42	37	M

TABLE 7 (cont.)

DIFFERENTIAL APTITUDE TEST SCORES FOR CONTROL GROUP

STUDENT NUMBER	SCORE (VR + NA)	SEX
C43	45	M
C44	62	F

Range - 18-86

TABLE 8

GRADE-POINT AVERAGES FOR TREATMENT GROUP

STUDENT NUMBER	GPA[1]	SEX
T1	77	M
T2	64	M
T3	78	M
T4	78	M
T5	76	M
T6	80	M
T7	43	M
T8	62	M
T9	56	M
T10	60	M
T11	92	M
T12	72	M
T13	89	M
T14	59	M
T15	55	M
T16	61	M
T17	57	M
T18	73	M
T19	49	M
T20	90	M
T21	67	M
T22	68	M
T23	62	M
T24	65	M
T25	70	M
T26	64	M
T27	69	M
T28	50	M
T29	73	M
T30	44	M
T31	64	M
T32	76	M
T33	62	M
T34	76	M
T35	65	M
T36	74	M
T37	77	M
T38	57	M
T39	58	M
T40	66	M
T41	66	M
T42	57	M
T43	59	M

TABLE 8 (cont.)

GRADE-POINT AVERAGES FOR TREATMENT GROUP

STUDENT NUMBER	GPA[1]	SEX
T44	60	M
T45	46	M
T46	61	M
T47	56	F
T48	53	F
T49	59	M
T50	66	M
T51	58	M

Range - 43 to 92

Mean - 65.078

1 Averages are for grade ten literature, composition, social studies and science.

TABLE 9

GRADE-POINT AVERAGES FOR CONTROL GROUP

STUDENT NUMBER	GPA[1]	SEX
C1	69	M
C2	81	M
C3	54	M
C4	60	M
C5	85	F
C6	51	M
C7	52	M
C8	60	M
C9	55	M
C10	75	M
C11	63	M
C12	44	M
C13	48	M
C14	82	M
C15	89	M
C16	68	M
C17	73	M
C18	57	M
C19	72	M
C20	73	M
C21	70	M
C22	58	M
C23	76	M
C24	62	M
C25	66	M
C26	67	M
C27	90	F
C28	74	M
C29	56	F
C30	55	M
C31	56	M
C32	64	M
C33	67	M
C34	56	M
C35	55	M
C36	70	M
C37	55	M
C38	79	M
C39	86	F
C40	52	M
C41	40	M
C42	61	M
C43	62	M

TABLE 9 (CONT.)

GRADE-POINT AVERAGES FOR CONTROL GROUP

STUDENT NUMBER	GPA[1]	SEX
C44	79	F

Range - 40 to 90

Mean - 65.159

1 Averages are for grade ten literature, composition, social studies and science.

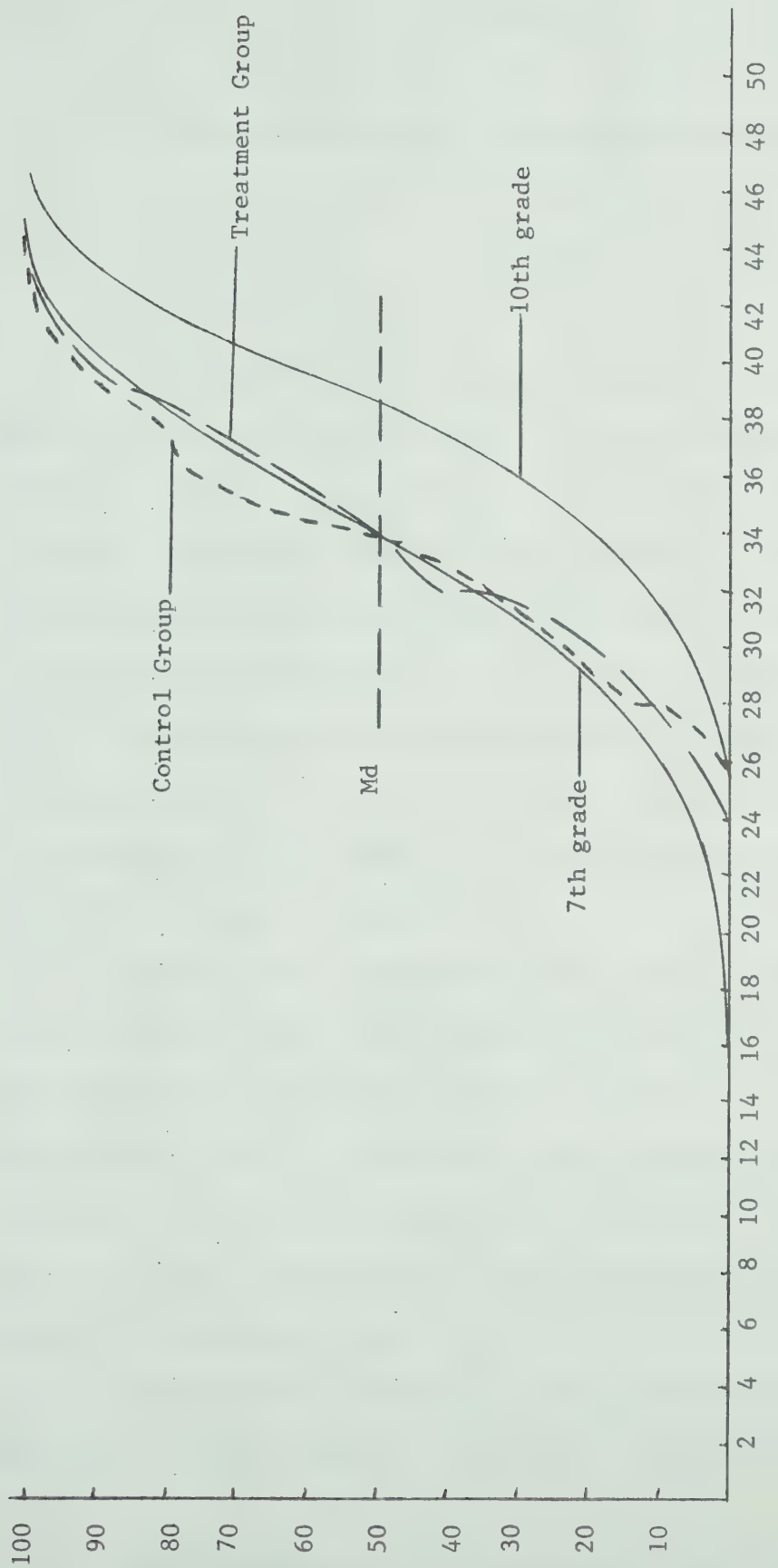

Figure 2. Cumulative Percentage Ogives of Total CMI Scores for Treatment Group and Control Group vs Iowa grades 7 and 10. (Crites, 1973, p. 15).

CHAPTER V

SUMMARY, CONCLUSIONS, OBSERVATIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to measure the effect of participation in a vocational cluster on the development of a student's vocational maturity. Additionally, the researcher investigated the possible relationship of Career Maturity Inventory scores to either or both of Differential Aptitude Test scores (Verbal Reasoning plus Numerical Ability) and grade ten grade-point averages.

The research was experimental in design using a treatment and a control group with a statistical control on suspected potentially contaminating variables, namely: (1) raw intelligence scores and (2) grade-point averages for grade ten.

The sample for the treatment group and the control group was taken from the total number of grade ten students who had registered for the vocational cluster during the 1973-74 school year at Melville Comprehensive School. The treatment group included all students enrolled in a vocational cluster for the first semester while the control group consisted of all the vocational cluster students enrolled in the second semester of that school year.

The instrument selected for this study was the Attitude Scale of the Career Maturity Inventory developed by Crites at the University of Iowa.

The CMI scores for the treatment and control groups were compared using a one-way Analysis of Variance statistic. Pearson

product-moment correlations were calculated to determine the correlation of CMI scores with each of DAT (VR + NA) scores and GPA's.

Conclusions

The data analysis revealed a probability value of 0.148239 for correlation of Career Maturity Inventory scores with Differential Aptitude Test scores (Verbal Reasoning plus Numerical Ability). When this probability value was compared to the level of significance value of .10, it was concluded that CMI scores do not correlate with DAT (VR + NA) scores. The data also revealed a probability of 0.372850 for correlations of Career Maturity Inventory scores with grade ten grade-point averages. When this probability value was compared to the level of significance value of .10, it was concluded that CMI scores do not correlate with GPA's.

The experimental hypothesis stated that:

> The treatment group, composed of grade ten students who took a vocational cluster of one semester, will have a higher career maturity mean score than the control group, composed of grade ten students who plan to enroll in a vocational cluster during the second semester of the same year.

This hypothesis was rejected at the .10 level of significance. It was therefore concluded from this research that a vocational cluster appears to have no effect on a student's vocational maturity.

Observations

This section outlines possible reasons why no significant differences were found between the treatment and control group when

measured on the Career Maturity Inventory.

Research by Krumboltz and Thoresen (1964), Krumboltz and Schroeder (1965), Thoresen and Krumboltz (1967) and Pucel and others (1972), which has been discussed in Chapter II, led the researcher to believe that it was reasonable to expect that exposure to the mechanics vocational cluster would increase a student's vocational maturity as measured by the CMI. However, this treatment may not have been appropriate for the age or level of vocational maturity of the students in this research sample.

A comparison of the cumulative percentage ogives for each of the treatment group and the control group to the ogives for the standardization sample, stratified by grade levels, suggests that the sample for this study may not have been as vocationally mature as most grade ten students. This may also suggest that the treatment could be appropriate for normal grade ten students but may not have been appropriate for the students in this study since they scored at approximately the seventh grade level on the Attitude Scale of the Career Maturity Inventory.

Another reason for the failure of the treatment to produce significant differences in vocational maturity may be related to the effectiveness of the instructional methodology for achieving some of the objectives of the cluster program of studies, namely: (1) To assist students in developing an appreciation for the world of work, (2) To help students to develop an awareness and understanding of "on the job" life in various selected industries and (3) To make students aware of the scope of careers available through industry and related fields.

Although the sampling error was not thought to be significant, it may have contributed to the failure of this research to find significant differences between the treatment and control group. Sampling

error was due to the size of the sample and the fact that the samples were not randomly assigned to treatment and control groups. Further sampling error was due to the fact that three students had to be eliminated from the study because of pertinent information which was not available for these students, as has been discussed in Chapter III.

Recommendations

As a result of this study, the following recommendations are made:

(1) That the Career Maturity Inventory Attitude Scale be administered to a large number of students in Saskatchewan schools to establish CMI norms for the Province of Saskatchewan.

(2) That a follow up study of the participants involved in this investigation be made one year after they graduate from high school to determine if differences exist in vocational maturity between the treatment and control groups.

(3) That the same students involved in this study be involved in a logitudinal study to determine if their vocational maturity has changed as a result of instruction and general maturity.

(4) That personnel in the Department of Education in the Province of Saskatchewan, who are interested in research, conduct research similar to this study in other schools of the province where a vocational cluster is taught to

determine if students involved in other cluster programs show a higher vocational maturity, on the CMI than do students not involved in a vocational cluster. Care should be taken to reduce the problems of sampling error outlined in this chapter.

(5) That the Industrial Education Staff, of Melville Comprehensive School, seriously review the instructional methodology of the vocational cluster program of studies to determine if the methodologies used to present instructional content are effectively achieving the objectives outlined in this chapter.

B I B L I O G R A P H Y

B I B L I O G R A P H Y

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APPENDIX A

A COPY OF THE RESEARCH INSTRUMENT AND RELATED MATERIALS CAN BE FOUND IN THIS APPENDIX

CAREER MATURITY INVENTORY

DIRECTIONS FOR BEGINNING THE ADMINISTRATION SESSION

Follow these directions before administering the Attitude Scale. If the Competence Test will be administered during this session, do not repeat these directions.

Before administering the Attitude Scale, make sure the biographical data on the Answer Sheet is completed and that the method of marking answers is understood. Follow the directions for the specific Answer Sheet being used. Read aloud all instructions preceded by the word SAY. If the same Answer Sheet is being used in successive testing sessions, make sure that each person receives his own Answer Sheet each time.

When everyone has completed the biographical data on the Answer Sheet,

SAY: I am going to give you a copy of the Attitude Scale booklet. Please do not open the booklet until I tell you to.

Distribute one Attitude Scale booklet to each person taking the inventory.

When everyone has received a booklet,

SAY: Open your booklet and look at Page 2 where it says "About This Inventory." Read this paragraph silently while I read it aloud;

About This Inventory

The Career Maturity Inventory has been constructed to survey the various attitudes and competencies which are important in making decisions about your career; it is not a personality inventory, an interest inventory, an achievement test, or an aptitude test.

This inventory consists of an Attitude Scale and a Competence Test. The Attitude Scale, which you are about to take, asks you about your attitudes and feelings toward making a career choice and entering the world of work. The Competence Test is more concerned with knowledge about occupations and the decisions involved in choosing a career.

The information you get from taking the Career Maturity Inventory can be used in choosing and planning for your career and can contribute to your career maturity. Complete this inventory carefully and thoughtfully; it may help you choose a more satisfying and successful career.

Take time to answer any questions which may be asked about the introductory statement.

Suggested Time Limit: 20 minutes

SAY: Now look at Page 3 where you will find the "Directions." Read them silently while I read them aloud:

Directions

There are a number of statements about career choice in this booklet. Career choice means the kind of job or work which you think you will probably be doing when you have finished all of your schooling.

Read the statements and mark your answers in the section marked Attitude Scale on the separate Answer Sheet. If you agree or mostly agree with the statement, use your pencil to blacken the space with a T. If you disagree or mostly disagree with the statement, blacken the space marked with an F. Be sure that your marks are heavy and black and that they completely fill the spaces. Erase completely any answer you wish to change. Do not make any stray pencil marks on the Answer Sheet.

When you are sure everyone understands the directions,

SAY: In the Attitude Scale section of your Answer Sheet find the row of spaces numbered "1." Mark your answers starting in this row. Mark only one space for each item. Make your mark heavy and black and make sure that it fills the space.

Follow the instructions at the bottom of each page and continue to work until you reach the word STOP. Read and answer every item. You will have about twenty minutes to complete the Attitude Scale. Near the end of the time limit, I will tell you how much time remains. Everyone will have enough time to finish. Please do not mark in the test booklet. Are there any questions?

Pause to allow time for questions.

SAY: Turn to Page 4 of your booklet.

Pause to allow time for everyone to turn the page.

SAY: BEGIN.

Start timing and record the starting time in the space provided. _____ (time)

During this time, the test administrator and assistants may help in the marking of answers, clarifying procedures, and finding the right place on the Answer Sheet, but care should be taken to avoid indicating a specific answer or pointing out the rationale for any item.

After approximately 15 minutes

SAY: Most of you should have almost finished. Would you please try to complete this part in the next few minutes?

After approximately 5 minutes,

SAY: Is there anyone who has not finished?

If anyone has not finished,

SAY: You may have a few more minutes to finish.

How much time is allowed for those who have trouble finishing is a decision based on the available time and the purpose of testing. The CMI was not designed as a timed test and the most complete information on each individual will be obtained if everyone has a chance to answer all of the items.

When you have ascertained that everyone has finished,

SAY: This is the end of the Attitude Scale. Make sure that you have completely erased any unwanted marks on your Answer Sheet.

FORM A - 1

ATTITUDE SCALE

CAREER MATURITY INVENTORY

DIRECTIONS

There are a number of statements about career choice in this booklet. Career choice means the kind of job or work which you think you will probably be doing when you have finished all of your schooling.

Read the statements and mark your answers in the section marked ATTITUDE SCALE on the separate Answer Sheet. If you agree or mostly agree with the statement, use your pencil to blacken the space marked with a T. If you disagree or mostly disagree with the statement, blacken the space marked with an F. Be sure that your marks are heavy and black and that they completely fill the spaces. Erase completely any answer you wish to change. Do not make any stray pencil marks on the Answer Sheet.

Due to copyright restrictions, a copy of the Career Maturity Attitude Scale cannot be included in this thesis.

CAREER MATURITY INVENTORY

ATTITUDE SCALE

ANSWER KEY

1. False
2. True
3. False
4. False
5. False
6. False
7. False
8. False
9. False
10. False
11. False
12. False
13. False
14. False
15. False
16. False
17. False
18. False
19. False
20. False
21. False
22. True
23. False
24. False
25. False
26. False
27. False
28. False
29. False
30. False
31. False
32. False
33. False
34. False
35. False
36. False
37. False
38. True
39. False
40. False
41. False
42. True
43. False
44. False
45. True
46. True
47. True
48. False
49. False
50. False

APPENDIX B

A COPY OF A LETTER TO McGRAW-HILL RYERSON LIMITED
REQUESTING PERMISSION TO INCLUDE COPIES OF THE RESEARCH
INSTRUMENT AND RELATED MATERIALS IN THIS THESIS
CAN BE FOUND IN THIS APPENDIX

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND
VOCATIONAL EDUCATION
TELEPHONE (403) 432-3678

THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA
T6G 0Y1

July 9, 1975.

McGraw-Hill Ryerson Limited,
330 Progress Avenue,
Scarborough, Ontario.
M1P 2Z5

Dear Sirs:

I am currently conducting research at the University of Alberta as part of the requirements for the degree of Master of Education. This research involved the use of the Attitude Scale of The Career Maturity Inventory. I would like to include a copy of the Attitude Scale, the answer sheet, the scoring key and the directions for administering the scale, in my thesis and am requesting your permission to do so.

Please reply by return mail or call (403) 432-4270, the office of my thesis supervisor Dr. C. H. Preitz.

Sincerely yours,

W. David Thompson,
Graduate Student,
Department of Industrial
and Vocational Education.

WDT/ck

McGraw-Hill Ryerson Limited
330 Progress Avenue
Scarborough, Ontario M1P 2Z5
Telephone 416/293-1911, Telex 02-21661

July 14, 1975.

Mr. W. David Thompson,
Graduate Student,
Dept. of Industrial & Vocational Education,
The University of Alberta,
Faculty of Education,
Edmonton, Alberta.
T6G OY1

Dear Mr. Thompson:

The CAREER MATURITY INVENTORY, as set forth in your letter of July 9th, may be included in your thesis. However, we will require a letter from Dr. Preitz as per the attached.

Sincerely,

B Mears

BM

Mrs. Bernice Mears,
Testing & Evaluation Services.

APPENDIX C

A COPY OF THE COURSE OUTLINE FOR

MECHANICS CLUSTER PROGRAM OF STUDY

MAY BE FOUND IN THIS APPENDIX.

MELVILLE COMPREHENSIVE SCHOOL
Melville, Saskatchewan

Subject: Mechanics Cluster 13

Principal: Mr. J. A. Pacholka

1. Purpose:

This course will replace all previously modified and approved grade ten industrial courses, namely Mechanics 13 ADM and Mechanics 13 EDP that were offered at this school.

Specified Objectives

1. To assist students in developing an appreciation for the world of work.

2. To help students to develop an awareness and understanding of "on the job" life in various selected industries.

3. To make students aware of the scope of careers available through industry and related fields.

4. To acquaint students with all the industrial and vocational programs of this school.

5. To develop basic knowledge and skills in each of the areas of this mechanical cluster.

2. Articulation:

There is no prerequisite.

This program is designed to provide opportunities for students at the grade 10 level to explore, experience and familiarize themselves with the industrial and vocational areas. These areas include electricity, electronics, automotive, welding, drafting, mechanical technology and industrial relations. Upon successful completion of this program, the student will be given one credit. The courses deal with basic theory and practice and introduction to the equipment in each area. It involves a study of basic fundamental principles and skills. It is designed to help students to make a more knowledgeable choice of industrial and vocational courses that may be taken at higher levels and eventually a more knowledgeable career choice.

3. Performance Objectives

The student will be able to perform generally in the cognitive domain (mental achievement), the affective domain (values and attitudes), and psychomotor (manual skills). In the performance tasks students will have to demonstrate thinking (application, analysis, synthesis, evaluation). Participation in discussion is vital not only in class, but with other students and at home.

4. Content

Mechanics 13 - Introductory Program

A. Drafting - 20 hours - Mr. W. Smith

1. Basic Graphical Techniques
   - Freehand sketching
   - Materials - scale - blocking view - procedures

2. Engineering Lettering
   - Styles - Proportions - Strokes - Spacing

3. Drawing with Instruments
   - Care and use of tools
   - Layout procedures
   - Lines

4. Drawing to Scale
   - Reading and using scales
   - Layout and measuring for one view drawing drawn to scales

5. Specifying Size
   - Dimensioning and Terminology
   - Techniques of dimensioning on plane surfaces- arcs - curves - angles - fillets - rounds

6. Inking
   - Orientation to tools and equipment

7. Reproduction
   - Orientation to equipment

B. Electrical Technology - 20 hours - Mr. W. Smith

1. Introduction
   - Personal safety
   - Historical importance
   - Atomic structure
   - Electro-statics

2. Basic Units - Volts, Amperes, Ohms - Relationship
   - Symbols, multiples and sub-divisions
   - Sources of electrical potential
   - Factors affecting resistance
   - Color code
   - Current flow in simple circuits

3. Series and Parallel Circuits
   - Ohms Law relationship in simple circuits
   - Cells in series and paralles
   - Resistors in series and parallel
   - Current flow in series and parallel circuits

4. Power
   - Power in D.C. circuits
   - Watts Law
   - Power rating of equipment
   - Power measuring equipment

C. Automotives - 20 hours - Mr. S. Krotenko

1. Tools
   - use and care

2. Safety

3. Introduction to Brakes
   (a) Components
   (b) Kinds
      - hydraulic
      - mechanical

4. Steering
   - wheels and tires
   - power and manual
   - geometry

5. Transmission
   - gears
   - standard
   - automatic
   - seals
   - uses

6. Differential (operation)
   - standard
   - posi-traction

7. Engines
   - principles of operation, construction, 2 and 4 cycle, Wankel, one cylinder, multi-cylinder

8. Tune - up
   - electrical circuits and components
   - ignition circuit and components

D. Introductory Welding - 20 hours - Mr. D. Thompson

1. Introduction to Oxy-Acetylene Welding
   - Safety procedures and precautions
   - Set-up and operating of equipment
   - Run beads with and without filler rod in flat position on 10 and 16 gauge mild steel
   - Make butt joints on 10 and 16 gauge mild steel flat position

2. Introduction to Electric Arc Welding
   - Safety procedures and precautions
   - Power sources
   - Electrodes
   - Run beads on various thicknesses of mild steel in the flat position
   - Butt joints on 1/8" and 1/4" plate in flat position

3. General Knowledge
   - History and development of the arc and oxy-acetylene welding processes
   - Welding terminology
   - Cylinder construction
   - Handling and storage of cylinders
   - Occupational opportunities in the welding field

E. Introductory Mechanical Technology- 10 hours -
- Mr. D. Thompson

1. The slide Rule
   - Students will develop skill in the use of the "C" and "D" scales for multiplication and division.

2. Materials Testing
   - Students will learn how to test a variety of materials to determine:
     (a) tensile strength
     (b) compressive strength
     (c) shear strength
     (d) hardness

F. Industrial Relations - Pre-employment Program - 10 hours -
Mr. G. Artemenko

1. Work
   - what it is in the general sense as well as in industry

2. Economy of the Country
   - terminology
   - sectors
   - labor force

3. Unions and Collective Bargaining
   -function of unions
   - structure
   - open and closed shops
   - bargaining procedures
     - arbitration
     - conciliation
   - strikes and lockouts
   - grievance procedures
   - parliamentary powers

4. Welfare of Workers
   - labor laws
   - unemployment insurance
   - Workmen's Compensation
   - pension plans

5. Finding a Job
   - CMC
   - applying for a job
   - application forms
   - interviews

6. Your First Job
   - attitudes
   - importance of workmanship
   - pay cheque deductions
   - proper use of credit

5. Methodology

A team teaching mini- course approach is taken. Observation, demonstration, discussion and student "hands-on" performance will be stressed. Students will also do some research, independent study, case studies, simulations and role-playing.

6. Resources

Textbooks - none.

Students will be utilizing library and shop material.

Extensive use will be made of book materials, overlays, filmstrips, films, charts and "hand-on" equipment.

7. Means of Evaluation

Student achievement will be assessed by continuous evaluation of student progress.

Means of evaluation will be consistent with methodology and performance objectives.

Marks will be assessed by means of testing of recall of information and understanding of concepts. Students will be measured on their skill performance and problem-solving situations and application of knowledge.

APPENDIX D

THIS APPENDIX CONTAINS A COPY OF THE

COMPUTER PRINT-OUT FOR THE DATA ANALYSIS OF THIS STUDY.

CORRELATIONS CMI/IQ/GPA

NO. OF INDIVIDUALS = 95

NO. OF VARIABLES INPUT = 3

NO. OF VARIABLES GENERATED = 0

TOTAL NO. OF VARIABLES = 3

KR-20 RELIABILITY = 0.5759

MEANS

	1	2	3
1	34.263153	45.305252	65.115784

STANDARD DEVIATIONS (UNBIASED)

	1	2	3
1	4.422404	12.107737	11.549030

CORRELATIONS

	1	2	3
1	1.000000	0.149479	-0.092458
2	0.149479	1.000000	0.644056
3	-0.092458	0.644056	1.000000

T-VALUES ASSOCIATED WITH R's

	1	2	3
1	0.0	1.457905	-0.895472
2	1.457905	0.0	8.119245
3	-0.895472	8.119245	0.0

PROBABILITIES OF T's

	1	2	3
1	0.0	0.148239	0.372850
2	0.148239	0.0	0.000001
3	0.372850	0.000001	0.0

ANALYSIS OF VARIANCE, CONTROL VS EXPERIMENTAL GROUP. (ANOV11).

NUMBER OF GROUPS = 2
TOTAL NUMBER OF OBSERVATIONS = 95
(3X,F2.0,5X,I1)

MEANS FOR GROUPS

1	34.078
2	34.477
GRAND MEAN=	34.263

SUM OF SQUARES

1	0.60178000E+05
2	0.53187000E+05

ANALYSIS OF VARIANCE

SOURCE	SS	MS	DF	F	P
GROUPS	0.37500000E+01	0.37500000E+01	1.	0.19	0.664
ERROR	0.18346875E+04	0.19727814E+02	93.		

VARIANCES OF GROUPS

1	18.994
2	20.581